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ABSTRACT

Computer conferencing (CC) is rapidly becoming a viable and useful adjunct to many distance education delivery systems. This paper deals with the general questions of what might constitute exemplary practice in using CC for teaching and learning, as well as features to look for when selecting a CC system. The "Do's" include: test the technology thoroughly; provide high quality instructional materials and documentation; provide high quality technical support; build CC skills gradually; provide study guides; make CC integral and relevant; plan for information management; plan for group development; keep discussions focused; specify expectations; use a variety of pedagogical techniques; and create discussion summaries. In a CC environment, there are also practices to avoid. These "don'ts" include: using computer mediated communication as an add-on; monopolizing and/or sermonizing; allowing any individuals to dominate; permitting inappropriate exchanges; including "fluff" in the course; and underestimating the work involved. (Contains 15 references.) (AEF)

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Exemplary Practices in Computer Conferencing

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Abstract

Computer conferencing (CC) is rapidly becoming a viable and useful adjunct to many distance education delivery systems. As powerful, user-friendly, computer conferencing systems come onto the market, educators are tempted to avail themselves of this enticing technology. However they usually don't have to work for long with computer conferencing before they find that their knowledge of what constitutes good practice with this particular medium is lacking. It quickly becomes apparent that teaching a course via computer conferencing is quite a different proposition than teaching the course in the face-to-face classroom setting. Moreover, teaching via computer conferencing is quite distinct from teaching the course via other distance education technologies (e.g., interactive television or audio-conferencing). Furthermore, as has been shown with other communication technologies, simply trying to mimic the face-to-face classroom experience is likely to prove sub-optimal. As Bates (1995) point out, one needs to understand the pedagogical strengths and weaknesses of the medium used to deliver content before one can use that medium optimally for learning.

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This paper deals with the general question of what might constitute exemplary practice in using CC for teaching and learning by addressing the following specific questions:

- What things should you do and shouldn't you do when using computer conferencing for teaching and learning?
- What features should you look for when selecting a computer conferencing system for teaching and learning?

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This paper deals with the general question of what might constitute exemplary practice in using CC for teaching and learning by addressing the following specific questions:

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> Computer conferencing is the use of an enhanced electronic mail environment to establish communication—asynchronously or synchronously—among participants who may be separated by time and/or distance. Computer conferencing allows a student to engage in individual communication with another student or with the instructor, or to participate in group communication with other students and the instructor. The communication may take place via a single multi-user computer or via multiple computers connected by a network.
>
> Misanchuk, Morrison, and Peterson, 1997, p. 1-2

Computer conferencing (CC) as applied to teaching and learning is a medium quite unlike others. It has unique capabilities and advantages (elaborated in Misanchuk, Morrison, and Peterson, 1997) that make it a medium of choice, especially in a distance education context. Certain applications may prove more effective than others, and it is virtually certain that particular teaching strategies will be more effective than others within a CC context. While the literature provides a good deal of guidance about what to do and what not to do with other technologies, information on what constitutes exemplary practice with computer conferencing is just emerging. This paper addresses a number of the "Do's" and "Don'ts" of computer conferencing. These guidelines for practice are gleaned from both the experiences of the authors in several roles (e.g., as learners in CC courses, facilitators of CC courses and conferences, and as instructional designers of university-level CC courses) and from reports of exemplary practice in the literature.

Despite the prescriptive nature of our language ("Do's" and "Don'ts") we do not presume that these guidelines are the final word, supported by extensive experience and even empirical research; rather, we offer them as starting points for newcomers to CC. You may consider them lessons learned from the School of Hard Knocks. We hope that, by presenting them for your consideration and emulation, they will help you avoid the (sometimes painful) lessons we have experienced.

The "Do's"

Do Test the Technology Thoroughly

A frequent cause of failure of CC trial courses is not taking sufficient time at the outset to become thoroughly familiar with all the features and bugs of the CC system. Reading the manuals and relying on manufacturer's descriptions of how things work is usually not enough. It is critical that extensive "real-world" testing be conducted on the particular CC system you will be using before the course is implemented. When 30 students are on-line, all ready to learn, is no time to be discovering glitches in the software, hardware, or documentation! We recommend running a few mock courses initially, involving course developers and SMEs, to ensure the CC system and the course architecture operate as envisioned. If possible, some subsequent trials involving naive users who are representative of the learner cohort will usually uncover additional problems and show where refinements are needed.

Do Provide High Quality Instructional Materials and Documentation

Students are unlikely to be familiar with the computer conferencing system you plan to use, and will therefore require very high quality instructional materials and software documentation to help them install and use the software. Many students will have limited or no experience with computers; an even larger number of them will have limited or no experience with using modems on computers.

The documentation and manuals supplied by hardware and software vendors often fall short of the mark in terms of assisting naive users to get up and running on a CC system. It is quite possible that you will have to custom-design instructional materials and documentation that will adequately inform new users about how to install and use the software, while not overwhelming them with technical details and esoteric language. Even if the manufacturer's documentation is first-rate, you will undoubtedly have to add some information that is unique to your configuration (e.g., modem telephone numbers, IP addresses, acceptable baud rates, etc.). This must be done in such a way that is not intimidating or confusing.

A key to ensuring high quality in these materials, of course, is to test them initially with knowledgeable users, refine them, then pilot test them again with a number of people who are typical of the learner cohort.

Accuracy and currency are especially important. There are few things more frustrating than turning to a manual or guide for help only to find the documentation obsolete and/or inaccurate. The fact that system changes may take place unbeknownst to you can be especially challenging. If your CC system is being operated by a computing center, for example, you may have a rude surprise when the systems engineers decide that the Christmas break is an opportune time for them to upgrade system software, without regard for the facts that your students are in the middle of a course and that the changes have drastic effects upon the way they do things. Establish communication early with your computing center, and spell out what kinds of changes may have negative effects on your course operation. Strongly encourage the computing center to make changes between courses, rather than during courses.

Do Provide High Quality Technical Support

Excellent and timely technical support for the CC system is an absolute must. It is obvious that not all students will have the same trouble-shooting capabilities and skills; those less familiar with computers will require special handling.

Remember that the asynchronicity of CC imposes special demands regarding technical help. There is, for example, little use in having a Help service for learners if the employees of that service observe "regular office hours," and if the learners do most of their work, and need most of their help, in the evening hours. This may mean requiring extended service hours, at least in the initial phases of the course when most of the critical technical help is needed. Indeed, if your students are scattered across many time zones it may mean effectively requiring 24-hours support.

In addition to providing quality print materials and implementing a Help system, you should consider setting up a conference space in which participants can find technical help. These can take the form of a folder or conference space where students can post technical questions and answers. Harasim (1995) suggests that you encourage students to contribute to the technical knowledge base: "As a mutual help space, it encourages cooperation and social learning. The opportunity for students to share their discoveries in operating the system also builds confidence in using new communication and knowledge work tools" (p.5). Conferences can also have a file of frequently asked questions (FAQs), which participants can consult to trouble-shoot technical problem. The benefit of having such on-line resources the entire class can consult is to free instructor time up for on-line teaching and learning, rather than technical trouble-shooting.

Do Build CC Skills Gradually

Once the CC system and the course has been pilot tested and the real students have all successfully connected to the conferencing system, it is useful to set up a series of on-line exercises where they can experiment with CC-based techniques that will be required throughout the course. The exercises can begin very simply, with increasingly complex and demanding procedures being added gradually over time. For example, a good initial exercise is to ask students to post short biographies to a conference area specifically set up for such activities. This exercise not only acts as an opportunity to practice the procedures of opening conferences, posting messages, etc., but also represents an opportunity to contribute something personal, yet substantial, to the on-line group. Alternatively, you might create a "virtual cafe"—a conference space where students can join in non-course-specific discussion, exchange information, or pursue any mutually-interesting non-course-related topic. Ask students to spend some time getting to know their classmates over a virtual cup of coffee.

It has been our experience that students will learn only those on-line skills they need to get the immediate job done, so provide ample opportunity to practice new skills before they are required in the course.

Do Provide Study Guides

In addition to CC system documentation, other print-based materials usually form an integral part of a course. The course guide should be logically ordered and synchronized with the on-line activities and discussions. In other words, there should be a clear integration among all the elements in the print materials (i.e., objectives, study questions, instructions, article reprints, exercises, etc.) and the overall design of the computer conference component.

Initially, one might think that all course materials should be delivered via the computer for viewing on-screen. Potential savings in printing and mailing costs can be realized by taking advantage of this characteristic. It is true that with ever-increasingly sophisticated CC software, course related documents (e.g., study guides or readings from journals) can be sent as attachments to conference messages or posted as cross-platform documents (e.g., PDF files). However, experience shows that reading lengthy materials on-screen can be very tiring. Requiring students to conduct all their course activity on the computer may lead to frustration, fatigue, and physical ailments such as eye fatigue, repetitive strain injuries, and back fatigue (Eastmond, 1995, p.177). These things, in turn, may reflect negatively on the course itself. Until computer screens are capable of considerably higher resolution than at present, and have improved portability, ergonomics, and interactive interfaces, it may be wise to stick to print for basic course materials. Besides, posting all course materials electronically simply transfers the costs from the institution to the participants (i.e., they will likely print them for their reading comfort).

Also, the familiarity of print materials may offer a psychological touchstone: Learners are experienced at using print, and that may help them bridge more easily into the less familiar territory of learning in a computer conference environment.

Do Make CC Integral and Relevant

If you plan to use CC as an adjunct to either a face-to-face course or a distance course using other delivery media, ensure that the conferencing component is an integral part of the course and not simply an add-on. In other words, make sure you have a clear purpose for including the conferencing component; if CC is simply an option, it is less

likely participants will be inclined to use it (especially as the course progresses and assignments gain higher priority).

Obviously, if the bulk of the course is available only via the CC medium, CC is central—and presumably relevant—to the student's successful participation in the course. However, even when the course delivery medium is entirely CC-based, it is still sometimes the case that the adjunct course materials (say print-based readings) are not well-integrated with what is happening in the CC environment. Our recommendation, as already mentioned, is that you pay special attention to the integration of all components that make up your course.

A word of caution is in order here: Instructors new to CC may be inclined to simply take whatever print-based course materials they normally use in their teaching and attempt to plunk them into the CC course. Our experience is that this strategy is not likely to work very well. Simply adding a CC dimension to an existing course design will likely result in a volume of work what will simply overwhelm the learners (e.g., reading the ongoing daily CC dialogue, plus the regular amount of reading material allocated in a non-CC course).

Do Plan for Information Management

Due to the asynchronicity of CC, and the fact that there may be 20-30 students each posting messages several times a week, the sheer volume of information a student (and the instructor) must read simply to keep abreast of and participate in the conference activities can be enormous. There are likely a number of information management strategies available to help one cope, but two which make sense to us and are easily built into the design of the course are to:

- set time limits on the discussion of each topic, and
- advise students to limit the frequency and length of their contributions.

For the former, you might schedule discussion topics for specific periods of time only (e.g., two weeks), then close the topic. Ensure the timelines are of reasonable length to get the quality of discussion you are seeking. Allowing a small amount of overlap between sessions (to allow a late contribution) is also useful. The length of time particular conference topics are open, of course, need not be uniform, but topic closing dates should be specified when the topic is first broached.

The latter strategy (limiting the frequency and length of participant contributions) can be a critical stipulation, especially if you have a relatively large number of on-line learners. We would suggest a range rather than a specific number. For example, you might state at the beginning of the course that you expect an average participant to contribute between one and three messages per week and that these messages should be no longer that two screens long. By doing this, there is always the danger that you are limiting some individuals whose contributions would be significant and of high quality. However, by clearly stating your expectations, you will get a more representative conference input and will prevent a few individuals from dominating the class discussion.

Placing a criterion of quality on message postings could help eliminate trite or insubstantial contributions. In practice, it may be difficult to operationalize—who, for example, judges the quality of contributions and according to what measure? Also, such

a criterion may stifle contribution from less articulate participants, the very learners you may want to encourage to express their ideas on-line. A recent study by Gibson (1996) showed a progression of message quality across time (from content-based to critical and complex thinking skills). It may be that similar patterns of message quality development is an integral part of most CC-based courses. It would be a mistake, therefore, to apply an inappropriately high level of expectation of message quality to a group that, developmentally, is not ready for that level.

Do Plan for Group Development

Learning is a social, as well as a cognitive, activity (Vygotsky, 1978); learners need time to develop interpersonal connections. As in a classroom-based setting, considerations for group development must be included in your plan for the computer conference course. Although on-line participants cannot interact in any physical sense, they do nonetheless interact in a virtual sense. The exchange of ideas, emotions, and experiences can and does lead to the same sort of group development one would expect of any classroom-based cohort. The lack of visual cues, rather than being a detriment, may lead to a more intimate, less biased learning experience (i.e., without cues as to gender, age, or physical attributes learners may be less likely to be influenced by biases and pre-existing attitudes).

So, provide learners time and support for learning how to interact with one another, to develop as a group. Some preliminary research (Gibson, 1996; McDonald, 1996) suggests that more than 50% of learner contributions during the first three weeks of a computer conference are devoted to technical, interpersonal, and group development issues. Once these issues are dealt with, learners begin the discussion of content issues. Fortunately, strategies exist to promote group development while at the same time give learners some hands-on experience with the technology.

One such strategy is self introductions, which may be conducted in a number of ways, of which the following are merely exemplary:

- Post an initial greeting to the students. (Davie (1989) maintains that the facilitator can set the climate for participation and interaction by personally welcoming each and every learner in an electronic course.) Have each student send a two- or three-line greeting to the conference.
- Have students send personal messages to individual students; these could be responses to each of the greetings (you could have them send a "carbon copy" (cc) to the instructor, thus giving them practice in creating cc's).
- Have each student write and post a short biography. This could be posted in a conference space dedicated to this purpose or, if available, could be posted as the student's resumé.
- Have students post their hobbies, favorite activities, special interest, etc., to a "cafe" or "student lounge" space.
- Pair up students and have them interview each other through personal messages; then have each student post a biography of the student they interviewed
- Have students post a message outlining their reasons for taking the course and their own specific goals and objectives.

Do Keep the Discussions Focused

As in the face-to-face setting, the course instructor usually has the responsibility to facilitate ongoing discussion. Depending on the course content and design, this might include:

- keeping the discussion going and on track,
- ensuring all participants have "air-time,"
- maintaining an overall positive tone (not necessarily avoiding conflict, however),
- summarizing and/or synthesizing class discussion, and
- terminating topic discussion to then introduce a new topic.

From our experience, keeping the CC discussion focused is an especially important task. Because CC is asynchronous in nature, it is often difficult for students to follow the thread of exchanges (some software is better than others in facilitating this), especially if they have been absent for any period of time. Hence, the coherence of many discussions is, at times, elusive. It is important, therefore, to keep the discussion focused on the topic at hand and not allow tangents to add unnecessary confusion to the already onerous volume of messages.

Of course, this is easier said than done. For example, it is often difficult to predict the relative contribution of an apparently tangential and seemingly irrelevant message, yet such a message can sometimes lead to a fruitful discussion. Just as in a face-to-face setting, individuals can sometimes dominate the discussion with messages that have little to do with the current topic. The result may be frustration on the part of the group, perhaps leading to a reduction of quality contributions. Occasional prods from the course instructor, in the form of questions or short statements, can do much to help keep things on track and reduce the incidence of irrelevant contributions.

When dealing with individuals who appear to dominate the discussion, or are otherwise posting inappropriate responses, it is important not only to sensitively censure current behavior, but also to be clear about what needs to happen. Messages regarding someone's on-line behavior should be confidential (i.e., a posting from the instructor to the individual, not a message to the group). While problems need to be dealt with tactfully and responsibly, praise also needs to be given when warranted and appropriate. The point is, both reprimand and praise are part of the on-line instructor's duties, just as they are in the face-to-face context, and both must be dealt with in a timely and professional manner.

Finally, allow for "chit-chat." In other words, do set up a separate space for social chatter (e.g., a cafe-like environment) so that the academic spaces are not clogged with non-academic messages. Many learners need to relate to one another on a personal level, which may or may not include academic interests. This cafe space may be open or closed to the instructor, depending on the needs and characteristics of the course participants.

Do Specify Expectations

Have specific expectations for student participation and behavior, and communicate them to students at the beginning of the course. It is useful to state messaging requirements such as length, frequency, and focus. As well, details like the relative importance of typographical errors and spelling and the need for prompt responses should be identified. To maintain consistent participation, your instructional objectives should include specific reference to requirements for involvement in the conference, and your evaluation plan should also take these into account (e.g., allotment of grades for on-line participation). All course requirements, including information on pacing and linkages between readings and discussion, should be made clear in the study guide and via an on-line reinforcement.

Do Use a Variety of Pedagogical Techniques

One of the strengths of CC-based learning is that full participation is possible, with students at a distance being able to interact without the inconvenience of being in the same place at the same time. The key is to tap into the inherent opportunities afforded by the technology for participation and interaction by designing the course to do so. Space limitations do not allow for a description of the full range of design alternatives available to an on-line course. However, a few methods and techniques, culled from the experiences of on-line instructors and learners, are highlighted here for your consideration.

- Paulsen (1996) offers a comprehensive listing of pedagogical techniques useful for on-line learning. A student working independently could use on-line resources such as databases, applications, software libraries, or interest groups. This would be an example of what Paulsen calls a "one-alone" technique. A "one-to-one" technique would include setting up learning contracts, apprenticeships, internships, and correspondence studies. Examples of "one-to-many" techniques would include on-line lectures and symposia. "Many-to-many" techniques, which are more characteristic of CC-based courses, would include such on-line activities as debates, simulations or games, role playing, case studies, discussion groups, transcript-based assignments, brainstorming, Delphi techniques, nominal group techniques, forums, and project groups.
- Davie and Wells (1991) suggest posing questions to the group instead of supplying answers, deflecting student questions to the group, and generally taking a less "centre stage" approach.
- Harasim (1995) describes the use of on-line seminars, small group discussion, learning partnerships, dyads, peer learning groups, small working groups, and team presentations/moderating by learners. She also claims that computer conferencing is an excellent environment in which collaborative learning activities can thrive (Harasim, 1990).

Course content and concomitant process decisions will necessarily influence the "look and feel" of any particular CC course. It is important to emphasize the need to stay within the realm of competence when choosing any particular on-line pedagogical technique. Using a variety of techniques is desirable. However, overwhelming the on-line learner with variety may result in a less than optimal learning experience.

Do Create Discussion Summaries

A possible task for the on-line instructor is to ensure that discussions are periodically summarized and posted to the conference, either for further discussion or simply as a succinct representation of the pertinent highlights of that discussion. Alternatively, individual students might be asked to rotate the responsibility for summarizing a certain portion of the discussion. Given that learners' abilities to make good summaries can vary widely, it might be useful to make the summaries a group activity. One could, for instance, ask a student to make an initial draft of a summary, then post the document for additions, deletions, and/or modifications by the larger group. Any gaps remaining can then be filled in by the instructor, acting as a "seal of approval" for students (Tagg, 1994). The final version can then be archived. The set of summaries might even be used with another cohort of learners as a focus for analysis.

Two kinds of summarization are possible:

- *Digests* merely list the messages (in their raw form) contributing to a particular thread or conference topic. They are a chronologically ordered listing of the messages, along with the names of contributors and time and date of contribution. Digests may be edited for relevance or length, but proper notation should be used (e.g., ellipses [...] to indicate deliberate omissions).
- *Summaries* may be more than simple digests. They can attempt to synthesize the essence of the discussion. They should be accurate representations of the very best of what happened in that discussion. Any specific messages quoted should, of course, include the message, who wrote it, and when it was written.

The "Don'ts"

Experience indicates that there are certain things that it is wise *not* to do in a CC environment. While many of these are simply the opposite of the "Do's" of computer conferencing, it is useful to identify specific items that may very quickly turn an otherwise excellent learning opportunity into an on-line flop. Unfortunately, some of the "Don'ts" include things that seem to come naturally, or, at the very least, are easy to rationalize.

Don't Use CMC as an Add-On

We alluded earlier to the point that simply adding CC to an existing course design is not likely to prove optimal. The course usually needs to be designed pretty much from the bottom up, taking into account the strengths (and weaknesses) inherent in CC. While Mercer (1994) argues that there is some merit to beginning with an existing course, because efforts can then focus on the instructional design of the CC component and not on the instructional design of the course itself, our point is that it is likely that a more integrated CC course will result when it is designed as such from the beginning.

We would also recommend against simply add a CC component to a course without careful consideration of the reason for doing so. Given the demands of the technology (i.e., access to hardware, learning the software, etc.), is there really a solid pedagogical reason you want students to use computer conferencing in a particular course? It may not, for example, make much sense to use CC in a course that does not require a high level of discussion or one which has a low enrollment base. Making the CC component purely optional is probably not a very good strategy, as it will almost certainly be treated by many students as an unnecessary diversion in which they will choose not to participate.

Don't Monopolize and/or Sermonize

Don't feel that you, as the instructor, have to be involved in every discussion and/or be the sole source of knowledge. Learners can readily learn from one another, and you should foster that. A number of authors have pointed to the fact that one of the primary strengths of CC is that it supports active and collaborative learning (Hiltz, 1995; Harasim, 1990; Eastmond, 1995). Instead of taking center stage, feeling obliged to comment in every exchange, use CC's strength to advantage. Get to know your students and actively seek input from them. Not only does that help relieve you of some of the burden of instruction, but it is likely to provide a far richer learning experience than you could alone. This may take some getting used to, however. Not only you, but other students, will wonder why you are not acting as the "ultimate authority," and may even question your role in the course. It will be necessary for you to coach participants along, and let them know that it not only permissible but highly desirable that they learn from one another as well as from you.

The other side of this, of course, is that you must not neglect your responsibility to facilitate, encourage, and reward what you consider to be high-quality contributions. Particularly in light of the last point—removing yourself from some of the discussion—you are still required to provide leadership and are responsible for evaluation of students' performance.

Don't Allow Any Individuals to Dominate

Just as it is important to ensure that you do not dominate the discussion, it is also important to intercept any student's attempts to take over the discussion. This is not to say that one necessarily intervenes in a vigorous, heated discussion between participants; that may be a sign a healthy state of affairs. It is when particular participants feel obliged to be pompous or overly competitive that intervention may be necessary (Eastmond, 1995). If individuals are allowed to dominate, any attempts to foster collaborative learning experiences may be met with diminished enthusiasm. Again, just as in a face-to-face context, it may be necessary to speak with individuals on a one-to-one basis (i.e., through personal messages).

Don't Permit Inappropriate Exchanges

Tasteless and/or insulting exchanges, and sexist or racist language should not be permitted. Granted, such judgments are sometimes difficult (what is tasteless to one person may not be to another), but most people can agree on set of rules of discourse for the course. These should be posted in your initial message, outlining what is expected (e.g., timely and relevant responses) and what is not permissible (e.g., put-downs or cursing). It may become important to revisit the list of agreed-upon behaviors and to add to it as necessary. Students are often perfectly capable of coming up with their own set of on-line rules, so whenever possible, encourage this.

Don't Include "Fluff" in the Course

Given the sheer volume of the reading involved in participating in an on-line course, keep the "nice to know, but don't need to know" reading materials to yourself. Instructors often feel pressed to include all the reading materials deemed necessary in a face-to-face context without realizing the on-line course is quantitatively and often qualitatively different.

As a designer, you may be particularly challenged by this problem. "Going public" with a course (by making it visible to colleagues as well as students) can sometimes have the effect on teachers of trying to make the course appear robust and academically worthy by incorporating far too much material. (This same phenomenon has been observed in televised courses and courses using other media that are accessible to people outside the normally-closed classroom door.) Your task will be to ensure that learners aren't unfairly penalized by the mode of course delivery.

Don't Under-Estimate the Work Involved

Some administrators (and even some naive faculty members) appear to view computer conferencing as a solution to ever-increasing teaching workloads. After all, their thinking seems to go, you don't have to got to the classroom, you can work on the course any time you wish (i.e., you don't necessarily keep regularly-scheduled hours), and you don't even have to keep office hours! And of course computers save time and effort, don't they?

Experience has shown that the workload is not reduced, it's just changed. It would be a mistake to underestimate the amount of time the instructor will actually spend on-line, either participating in discussion or taking care of administrative details. These activities can take up huge amounts of time. Finally, although asynchronous, CC still requires a reasonable time window in which to respond— in other words, you can't just respond "when you have time" but rather must respond in a timely manner. These and other course responsibilities make a CC course every bit as demanding as most face-to-face courses. In fact, panelists at a recent conference on CC (Penn State, 1996) concurred that teaching a CC course took as much as one and one-half times the amount of time as teaching the same course in the classroom, particularly the first time the course was taught.

Conclusion

This paper outlined a number of activities we believe represent exemplary practice for the use of computer conferencing in educational contexts. Although we list the various practices under the headings of "Do's" and "Don'ts", we acknowledge that at this stage of development of the art of teaching with computer conferencing, such apparent prescription may be unwarranted. Rather, we intend them as guidelines, as starting points for exploration of effective use.

We do not claim that the list of practices we provide is exhaustive. Rather, it is a summary of the problems we encountered and decisions we made in applying computer conferencing, and we offer them as the beginning of a compilation of recommendations for newcomers to CC. As research and applications of computer conferencing in education continue to expand, we will continue to develop clearer and more comprehensive pictures of how this technology can be used to its full potential.

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